

***Rhaphidophora crassifolia* Hook.f. (Araceae: Monstereae): a new record for Sarawak and notes on the *Rhaphidophora* 'Hongkongensis' group in Borneo**

P.C. BOYCE

Malesiana Tropicals, Suite 9-04, Tun Jugah Tower, No. 18, Jalan Tunku Abdul Rahman, 93100 Kuching, Sarawak, Malaysia

Abstract

Rhaphidophora crassifolia Hook.f., a species hitherto known only from Peninsular Malaysia and southern Thailand is recorded as new for Sarawak and takes to 16 the number of species of *Rhaphidophora* for Borneo, of which five are endemic. A species description and photographs together with a new key to the *Rhaphidophora* species in Borneo is given.

Introduction

Revision work on *Rhaphidophora* (Boyce, 2001, 2005, 2006) in Borneo has established that there are 16 species (excluding that described here), of which five are endemic.

The most speciose group in Borneo with four species is the 'Hongkongensis' Group defined by shingling, non-skototropic seedling and shingling juvenile shoots, pre-adult and adult plants with climbing stems square to rectangular in cross-section, simple, often coriaceous leaf laminae, a petiolar sheath extending beyond the leaf base by short to rather long ligules and the sheath soon falling to leave a horseshoe shaped scar around the top of the apical geniculum. All species flower on free lateral shoots that are either angular or more-or-less terete in cross-section. Species in the 'Hongkongensis' Group are often lofty climbers and are frequently very inadequately collected.

Key to Adult Flowering *Rhaphidophora* in Borneo

- 1a. Mature leaf lamina pinnately divided 2

- 1b. Mature leaf lamina entire, with or without perforations, but never pinnately divided 3
- 2a. Plants always associated with sandy or rocky forest streams. Flowering plants usually rheophytic, rarely low-climbing on trees beside torrential streams **R. beccarii**
- 2b. Plants not specifically associated with watercourses.
- 3a. Juvenile shingling stage with falcate-lanceolate non-overlapping ascending leaves; adult plants with leaf pinnae no more than 2 cm wide and frequently much less; inflorescences solitary; spadix slender, not exceeding 13 cm long **R. tenuis**
- 3b. Juvenile shingling stage with ovate, overlapping spreading leaves; adult plants with leaf pinnae exceeding 3 cm wide; inflorescences several together; spadix stout, up to 25 cm long **R. korthalsii**
- 4a. Geniculum and abaxial surface of lamina pubescent 5
- 4b. Geniculum and abaxial surface of lamina glabrous 4
- 5a. Plants flowering on clinging stems. Leaves of mature plants extensively perforated, active shoot tips with black mucilage **R. foraminifera**
- 5b. Plants flowering on free lateral stems. Leaves of mature plants lacking or with only with scattered perforations; active shoot tips lacking black mucilage..... **R. puberula**
- 6a. Leaves always shingling, even in flowering individuals; leaf laminae stiffly coriaceous, broadly oblong-ovate-elliptic, 8–48 x 6.5–20.5 cm, bright green, slightly to markedly glaucous, base truncate-cordate to broadly cuneate. Flowering on clinging shoots..... **R. latevaginata**
- 6b. Leaves spreading in adult and flowering individuals; leaf laminae variously coloured but never glaucous. Flowering on free or clinging shoots 7
- 7a. Stems scabrid to asperous. Spathe exterior minutely puberulent **R. lobbii**
- 7b. Stems smooth. Spathe (where known) exterior glabrous 8

- 8a. Abaxial surface of lamina glaucous. Peduncle up to 18 cm long **R. typha**
- 8b. Abaxial surface of lamina never glaucous. Peduncle not exceeding 10 cm long 9
- 9a. Clinging stems square or rectangular in cross-section; tips of active stems with netted prophyll, cataphyll and petiolar sheath fibre.....**R. elliptifolia**
- 9b. Clinging stems various shapes in cross-section, including square or rectangular; tips of active stems without fibre 10
- 10a. Spadix stipitate; leaf lamina very thickly coriaceous**R. conocephala**
- 10b. Spadix sessile; leaf lamina variously textured but if thickly coriaceous then spadix sessile 11
- 11a. Inflorescences two, three or more together, each subtended by a prominent chartaceous prophyll and one or more chartaceous cataphyll; leaf lamina oblong-lanceolate or oblong-elliptic, entire to slightly perforated, glabrous **R. megasperma**
- 11b. Inflorescences almost always solitary, never subtended by prominent chartaceous prophylls and cataphylls; leaf lamina variously shaped but never perforated 12
- 12a. Clinging stems rectangular in cross-section 13
- 12b. Clinging stems more-or-less terete in cross-section 15
- 13a. Leaf lamina thickly coriaceous to almost fleshy, margins slightly reflexed, this becoming greatly accentuated in dried material. Clinging stems twisting to produce complex ridges **R. crassifolia**
- 13b. Leaf lamina thinly coriaceous, margins flat, leaf drying pale straw-coloured. Clinging stems not twisting 14
- 14a. Leaf lamina lanceolate-elliptic to falcate-lanceolate, 4.5–32 x 1.75–8.5 cm. Spadix weakly clavate-cylindrical, 3–6 cm long **R. sylvestris**
- 14b. LEAF LAMINA, NARROWLY ELLIPTIC TO NARROWLY ELLIPTIC-OBLONG, 20–29 X 4.5–7 cm. Spadix cylindrical, 8–14 cm long **R. elliptica**

15a. Leaf lamina narrowly falcate-elliptic to falcate-lanceolate or falcate-oblongate, 2.5–16 x 1.2–3 cm, drying uniformly pale straw-coloured. Spadix slender cylindrical, 2.5–7 cm long **R. minor**

15b. Leaf lamina subfalcate-lanceolate or oblong-elliptic, oblique, 10–19.5 x 2.5–6.5 cm, drying very dark brown. Spadix cylindrical-obtuse, 3–10 x 1 cm (fruiting specimen only) **R. cylindrosperma**

***Rhaphidophora crassifolia* Hook.f.**

Rhaphidophora crassifolia Hook.f., Fl. Brit. Ind. 6 (1893) 543; Ridl., Mat. Fl. Malay Penins. 3 (1907) 42; Engl. & K. Krause in Engl., Pflanzenr. 37 (IV.23B) (1908) 22, Fig. 5; Ridl., Fl. Malay Penins. 5 (1925) 122– **Type:** Malaysia, Perak, Batang Padang District, Batang Padang, Aug 1884, *Kunstler 8111* (holo, K).

Large, occasionally very large, moderately robust, semi-pachycaul homeophyllous liane to 10 m; **seedling stage** a non-skototropic shingling shoot; **pre-adult plants** rarely forming small terrestrial colonies of appressed shingling shoots; **adult shoot** architecture comprised of greatly elongated, clinging, physiognomically monopodial, leafy, non-flowering stems and short to moderately elaborated, free, sympodial, densely leafy, flowering stems; **stems** smooth, climbing stems rectangular in cross section, the angles winged, the surfaces between sulcate, the stem twisting to produce a complex series of ridges and channels, free stems more or less terete to weakly four-angled in cross section, often branching extensively, growing to considerable lengths and then pendent under their own weight, green, later dull brown, without prophyll, cataphyll and petiolar sheath fibre but active apices coated with clear mucilage, internodes to 10 x 2 cm on adherent shoots, usually shorter and less stout on free shoots, separated by prominent slightly oblique leaf scars, older stems woody; **flagellate foraging stems** absent; **claspings roots** densely arising from the nodes and internodes of clinging stems, densely pubescent; **feeding roots** rather rare, adherent, pubescent; **leaves** weakly spiralled on adherent and proximal portions of free shoots, densely distichous distally on flowering shoots; cataphylls and prophylls membranous, very quickly drying and falling; **petiole** shallowly canaliculate to grooved adaxially, 4–7 x 0.2–0.3 cm, smooth, with a slight apical and somewhat prominent basal geniculum; petiolar sheath prominent, extending to and encircling the apical geniculum, very swiftly drying and falling to leave a continuous scar from the petiole base, around the top of the apical geniculum and back to the base; lamina entire, falcate-elliptic-lanceolate to falcate-oblong or falcate-oblongate, 2.5–35 x 1–10 cm, thickly coriaceous to almost fleshy, upper surfaces glossy,

lower surfaces matte, base sub-ovate to acute or briefly decurrent, apex sub-acute with a prominent apiculate tubule, margins slightly reflexed, this becoming greatly accentuated in dried material; mid-rib barely raised abaxially, slightly sunken adaxially; primary venation pinnate, slightly raised abaxially and adaxially; *interprimaries* parallel to primaries, very slightly raised abaxially and adaxially; *secondary* and *tertiary venation* $\pm$ invisible in fresh material, barely visible in dried specimens; **inflorescence** solitary, subtended by a fully developed foliage leaf; *peduncle* compressed-cylindric-clavate, 1.7–2.5 x 0.2–0.3 cm; *spathe* cigar-shaped, stoutly short-beaked, 4–6.5 x 1–1.7 cm, thickly fleshy, dull green to dull yellow, swiftly falling at female receptivity; *spadix* cylindrical, sessile, inserted level on peduncle, 3.5–6 x 0.5–1.3 cm, dirty white; *stylar* region rather well developed, mostly rhombo-hexagonal, 0.8–1 x c. 1 mm, truncate; *stigma* punctiform, c. 0.3 mm diam.; *anthers* barely exerted at anthesis, pollen extruded from between ovaries; **infructescence** not observed.

Distribution: Peninsular Malaysia (Negri Sembilan, Perak, Selangor), southern peninsular Thailand (Narathiwat), Borneo (Sarawak: Miri).

Habitat: Primary lowland rainforest, dry *Dryobalanops* forest, peatswamp forest, wet evergreen forest, frequently but not exclusively associated with Karst limestone. 10–90 m altitude.

Notes: The remarkably thick leaves and complex patterns of ridges and channels (Plate 1) resulting from the twisting of the stems immediately distinguish *R. crassifolia* from the two most similar species in Sarawak, *R. elliptica* Ridl. and *R. elliptifolia* Merr. *Rhaphidophora crassifolia* may be further distinguished from *R. elliptifolia* by the lack of fibrous remains on the tips of the active shoots and from *R. elliptica* by the smaller (3.5–6) spadix (8–14 cm long in *R. elliptica*).

Other specimens examined: SARAWAK: Miri, Niah Suai, Niah National Park, trail to Great Cave, 03° 49' 21.7"; 113° 45' 44.1", *P.C.Boyce, Jeland ak Kisai & Jepom ak Tisai* AR-1464 (SAR). PENINSULAR MALAYSIA: Perak: Padang, Batang Padang, *Kunstler* ('Dr King's Collector') 8111 (K, holo); Wray 2260 (SING); Selangor: Genting Sempah 22 mile, Ulu Gombak F.R., *Stone* 5738 (KLU); Batu Cave ravine, *Nicolson* 1148 (US); Negeri Sembilan, Pasoh F.R., *La Frankie* 2185 (KEP); Johore, Pengkalan Raja, Pontian, *Ngadiman* SFN 36774 (B, BO, L, K, P, SING); Sg Kayu Ara, Mawai - Jemaluang road, *Corner* SFN 29318 (KEP, K, SING). THAILAND: PEN72. Narathiwat, Budho-Phadee N.P., Nam Tok Chatwarin, 6°06'N, 101°50'E, *Boyce* 1226 (BKF, K).



Plate 1. *Rhaphidophora crassifolia* Hook.f. Note the ridges along the twisted stem and coriaceous leaf.

References

- Boyce, P.C. 2001. The genus *Rhaphidophora* Hassk. (Araceae-Monsteroideae-Monstereae) in Borneo. *Gardens' Bulletin Singapore* **53**: 19–74.
- Boyce, P.C. 2005. A New Species of *Rhaphidophora* Hassk. (Araceae: Monstereae) from Borneo. *Gardens' Bulletin Singapore* **57**: 211–216.
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